



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/613,203	07/03/2003	Gurtej S. Sandhu	98-0957.01	4599

7590

05/04/2005

Charles Brantley
Micron Technology, Inc.
8000 S Federal Way
Mail Stop 01-525
Boise, ID 83716

EXAMINER

MALDONADO, JULIO J

ART UNIT

PAPER NUMBER

2823

DATE MAILED: 05/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/613,203

Applicant(s)

SANDHU ET AL.

Examiner

Julio J. Maldonado

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 February 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13, 52 and 53 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13, 52 and 53 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. The restriction as set forth in Office Action mailed on 01/25/2005 is withdrawn in view of Applicants cancellation of claim 59 in paper filed on 02/07/2005.
2. Claims 1-13, 52 and 53 are pending in the Application.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-4 and 8-13 are rejected under 35 U.S.C. 102(e) as being anticipated by Summerfelt et al. (U.S. 6,362,068 B1).

Summerfelt et al. (Figs.1-5) teach a capacitor structure including a bottom electrode layer (30); a first high-dielectric layer (32) contacting said bottom electrode layer (30), wherein said first dielectric layer is selected from the group including strontium titanate or metal-doped strontium titanate (Table 2); a second high dielectric layer (34) selected from the group including barium strontium titanate or metal-doped barium strontium titanate (Table 2); a third high-dielectric layer (32) selected from the group including strontium titanate or metal-doped strontium titanate (Table 2); and a top electrode (46), wherein said first dielectric layer has a first thickness, said second dielectric layer has a second thickness and said first thickness is different than said

Art Unit: 2823

second thickness, said first, second and third dielectric layers form a plurality of dielectric layers (column 3, line 17 – column 6, line 10).

Summerfelt et al. fail to expressly teach wherein at least two layers of said dielectric layer of said plurality exhibit different degrees of oxidation, wherein said second dielectric layer has a lower oxygen concentration than said first dielectric layer or wherein said layers exhibit different amounts of oxygen per unit volume. Summerfelt et al. inherently teach upon these limitations because Summerfelt discloses metal-rich dielectric layers.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Summerfelt et al. (U.S. 6,362,068 B1) as applied to claims 1-4 and 8-13 above, and further in view of the following comments.

Summerfelt et al. substantially teach all aspects of the invention but fail to disclose wherein said plurality of dielectric layers defines a thickness at most 200 angstroms; and wherein said first dielectric layer has a thickness of at least 10 angstroms. Notwithstanding, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose these particular dimensions because

Art Unit: 2823

applicant has not disclosed that the dimensions are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using another dimension. Indeed, it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

7. Claims 52 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirota (U.S. 6,228,702 B1) in view of the following comments.

Hirota (Figs.1A-3B) teach a capacitor structure including a bottom electrode layer (13); a first tantalum oxide layer (17) having a thickness from 10 angstroms to 30 angstroms; a second tantalum oxide layer (18) having a thickness from 30 to 80 angstroms; and a top electrode (20), said first and second dielectric layers defining a plurality of dielectric layers (column 4, lines 35 – 67 and column 16, lines 7 – 61).

Hirota fails to teach wherein said plurality of dielectric layers define a total thickness ranging from 50 to 70 angstroms, wherein said first and second tantalum oxide layers define a thickness ranging from 10 to 40 angstroms; and wherein said first tantalum oxide layer defines a thickness of about 20 angstroms. However, in the case where the claimed ranges “overlap or lie inside ranges disclosed by the prior art” a prima facie case of obviousness exists. MPEP 2144.05. Therefore, it would have been

Art Unit: 2823

obvious to one of ordinary skill in the art at the time the invention was made to use the thicknesses disclosed in the teachings of Hirota to arrive at the claimed invention.

Response to Arguments

8. Applicant's arguments with respect to claims 1-13, 52 and 53 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion


9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Julio J. Maldonado whose telephone number is (571) 272-1864. The examiner can normally be reached on Monday through Friday.

10. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri, can be reached on (571) 272-1855. The fax number for this group is 703-872-9306 for before final submissions, 703-872-9306 for after final submissions and the customer service number for group 2800 is (703) 306-3329.

Updates can be found at <http://www.uspto.gov/web/info/2800.htm>.

Julio J. Maldonado
Patent Examiner
Art Unit 2823

Julio J. Maldonado
April 25, 2005


George Fourson
Primary Examiner